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| 10/586,675      | 07/20/2006  | Ekkehard Mueh        | 288839US0PCT        | 8067             |

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ALEXANDRIA, VA 22314

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| EXAMINER |
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MILLER, JR, JOSEPH ALBERT

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| ART UNIT | PAPER NUMBER |
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1715

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| NOTIFICATION DATE | DELIVERY MODE |
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11/24/2010

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com  
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|                              |                                      |                                    |  |
|------------------------------|--------------------------------------|------------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/586,675 | <b>Applicant(s)</b><br>MUEH ET AL. |  |
|                              | <b>Examiner</b><br>JOSEPH MILLER JR  | <b>Art Unit</b><br>1715            |  |

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 November 2010.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) 4 and 5 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 6 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>See Continuation Sheet</u> .                                  | 6) <input type="checkbox"/> Other: _____                          |



Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :08/11/2010, 05/18/2010, 09/21/2009, 07/21/2008, 07/20/20060.



## **DETAILED ACTION**

### ***Election/Restrictions***

Applicant's election with traverse of Group 1, claims 1-3 and 6, as well as the species of vinyltrimethoxysilane (A) and CVD (B) in the reply filed on 11/11/2010 is acknowledged. The traversal is on the ground(s) that a finding of lack of unity finding related to the special technical feature must include interpretation of the claims in the light of the description. This is not found persuasive because, even though claims "must be given their broadest reasonable interpretation", per MPEP 2111 it is also states that it is improper to read limitations from the specification into the claim. The use of the specification is for understanding the language of the claim and not for "narrowing the scope of the claim by implicitly adding disclosed limitations which have no express basis in the claim".

It is noted that applicant's claim 1 is a process for forming an SiO<sub>2</sub> containing insulating layer on chips. The method is not particularly limited, except by use of a number of groups of compounds. By finding one compound in that group used to form an SiO<sub>2</sub> film, lack of unity has been shown. It is not clear to examiner what specific limitation examiner should be reading into the claim makes the lack of unity improper. Applicants have not argued how examiner has failed to take into account the description, or rather what aspect of the description.

The reasons for distinction of the species are that:



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- related to the method of deposition: spin-on and CVD methods are distinct in that CVD requires a material to be gaseous/vaporized while spin coating methods do not; the apparatus and methods of applying are normally distinct and in many cases the films deposited by each method are applied for different purposes (such as spin coating is a particularly common method of applying resist, for example).

- regarding the precursor applied: claims require any one of a very large number of compounds which are in different classes and each have different groups - even though all silanes or related silanes, without the species requirement examiner could be required to find *all* of the individual compounds noted in the specification (and claim 3), which would have been burdensome based on the large number of species.

The requirement is still deemed proper and is therefore made FINAL.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-3 and 6 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for forming a carbon-containing silicon oxide film, does not reasonably provide enablement for forming a(n) (pure) SiO<sub>2</sub> film. (The claim includes embodiments wherein a 'pure' SiO<sub>2</sub> film is formed). The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims.



The MPEP (2164.01(a)) discusses “Undue Experimentation Factors”, factors to be considered when determining whether there is sufficient evidence to support a determination that a disclosure does not satisfy the enablement requirement and whether any necessary experimentation is “undue.” These factors include the following, as related to instant claims:

(A) the breadth of the claims and (B) the nature of the invention: the claims include any method of film formation and a broad range of precursors;

(C) the state of the prior art: the prior art, such as Andidieh, teaches the same process method of CVD in order to form a carbon doped (silicon) oxide layer [0009-0013], even suggesting that a layer formed by CVD using only the precursor gas would include carbon [0014];

(D) the level of one of ordinary skill and (E) the level of predictability in the art: as per Andidieh, one would expect a carbon content in the film and therefore not be able to carry out the invention in order to form a pure SiO<sub>2</sub> film;

(F) the amount of direction provided by the inventor and (G) the existence of working examples: there are no actual examples provided by inventors and no direction as to how one would form a ‘pure SiO<sub>2</sub>’ film.

(H) In summary, the quantity of experimentation needed to make or use the invention based on the content of the disclosure is undue, based on the known prior art and applicants own disclosure. One of ordinary skill would consider that it would take an undue amount of experimentation to form a pure SiO<sub>2</sub> film when Andidieh teaches that the same precursors applied by the same methods form carbon doped oxide film –



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it is not further clear from applicants disclosure how one would either remove the carbon or produce a film without carbon (or other elements).

### ***Claim Objections***

Claim 1 is objected to because of the following informalities: it is not perfectly clear what compounds are required and/or optional to produce the SiO<sub>2</sub>-containing insulating layer. For example, line 9 states "with the silicon atom..." and line 10 states "mixture of..." - due to the length and wording of the claim, it is not exactly clear how these phrases modify the claim. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2 and 6 are rejected under 35 U.S.C. 102(b) as anticipated by Andidieh (2002/0192982).

Andidieh teaches a method of forming a carbon doped silicon oxide by applying a compound such as methyltrimethoxysilane in a CVD reactor [0009-0012].

Regarding the requirement to form an insulating layer on "chips", Andidieh teaches the use of the layer as an insulating for semiconductor devices [0002].



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Regarding the formation of a layer including "SiO<sub>2</sub>", instant application teaches that a CVD reactor including reduced or low pressure and/or plasma may be employed along with a vaporized precursor to form the insulating film on a hot surface (p4, line 30 - p5, 5). The same process conditions are applied by Andidieh [0009-0014] - while Andidieh generally teaches the use of oxygen and nitrogen in producing the thin film, Andidieh also teaches a non-preferred embodiment [0014] wherein only the precursor gas is employed and a carbon doped oxide is formed. Though Andidieh does not explicitly teach the result of the CVD method, including providing precursors such as methyltrimethoxysilane on a hot surface, forming an insulating material that includes SiO<sub>2</sub>, however, since the prior art and the present claims teach all the same process steps, the results of the insulating material including SiO<sub>2</sub> obtained by applicants process must necessarily be the same as those obtained by the prior art. Therefore by employing the process of Andidieh per above, it must necessarily result in the formation of an SiO<sub>2</sub> containing film.

Applicants specification (or claims) show(s) no differentiation of the method of forming an insulating layer that would convey to one of ordinary skill that the produced film would have different properties than that of the prior art.

Regarding claim 2, Andidieh teaches the use of CVD as noted.

Regarding claim 6, Andidieh teaches a process of forming a film as noted, for the use on chips.



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***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Andidieh (2002/0192982) in view of Komada (2001/0038894).



The teachings of Andidieh are described above, teaching the formation of an SiO<sub>2</sub> containing insulating layer on a chip but teaching the use of precursors such as methyltrimethoxysilane but not teaching the use of vinyltrimethoxysilane (VTMS).

Komada teaches that precursors such as VTMS or methyltrimethoxysilane may be used to form "SiO<sub>2</sub>-like" films by CVD [0136-0144].

It would have been obvious to one of ordinary skill in the art at the time of the invention to use VTMS as taught by Komada in the place of methyltrimethoxysilane in the insulating layer formation method of Andidieh.

It is noted that Komada teaches a preference for using compounds such as methyltrimethoxysilane instead of VTMS due to their lack of carbon to silicon bonding [0141], Komada nonetheless teaches that either precursor may be used to form an "SiO<sub>2</sub>-like" film by CVD. The teachings in the art suggest that Andidieh's carbon-doped oxide film would be similar to the "SiO<sub>2</sub>-like" film of Komada, based on the similarity of the precursors and methods of applying. The teachings further suggest that one replacing the precursor of Andidieh with that of Komada would expect a similar film to that taught in instant specification and therefore would expect the film to be an "SiO<sub>2</sub>-containing" film, per the arguments above.

Regarding operability of the precursor of Komada in the invention of Andidieh, while Komada suggests (does not state) that the carbon content would be lower by avoiding the Si-C bonding, he does not state that it does not occur with use of the preferred precursors (i.e. VTMS). Examiner further takes official notice that the



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presence of carbon in such films deposited by the preferred precursors of Komada is well known in the art.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOSEPH MILLER JR whose telephone number is (571) 270-5825. The examiner is on a flexible schedule, but can normally be reached at least Mon - Thurs, 6am to 3:30pm. Other times as required are available for interviews.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks, can be reached on 571-272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/JOSEPH MILLER JR/  
Examiner, Art Unit 1715

/Timothy H Meeks/  
Supervisory Patent Examiner, Art Unit 1715